Claims

1. A manufacturing method of the S355G10 super-thick steel plate for ocean engineering, wherein the manufacturing method of the S355G10 super-thick steel plate for ocean engineering comprises a steelmaking process, a slab heating process, a rolling process, a controlled cooling process, and a tempering process,

steelmaking process: Deep dephosphorization in a converter is adopted to make the P content in the molten steel be less than or equal to 0.013%, pretreatment and desulfurization of molten iron and LF deep desulfurization are adopted to make the S content in the molten steel be less than or equal to 0.003%, continuous casting adopts dynamic soft reduction and electromagnetic stirring to produce 320mm continuous casting slabs with center segregation of not higher than level C1.0;

heating process: The casting slabs are heated in a heating furnace, the heating coefficient is 10.0min/cm to 15.0min/cm, and the heating temperature is 1,180 to 1,220 DEG C;

rolling process: A two-stage controlled rolling process is adopted, the final temperature of the rough rolling in the first stage is more than or equal to 980 DEG C, and the initial rolling temperature in the second stage is less than or equal to 820 DEG C, and the finish rolling temperature is 770 to 810 DEG C;

cooling process: The rolled steel plate enters an ultra-fast cooling system for rapid cooling, the cooling rate is 10 to 20 DEG C/s, the self-tempering temperature is 520 to 580 DEG C, and then the stacking slow cooling is conducted;

tempering process: The tempering temperature is 560 to 600 DEG C, the holding time in the furnace is 300min to 400min, and after the tempering, the slabs are stacked separately and air-cooled to room temperature;

wherein the S355G10 super-thick steel plate is prepared from the following chemical components according to mass percent: 0.04% to 0.08% of C, 1.40% to 1.60% of Mn, 0.10% to 0.30% of Si, less than or equal to 0.013% of P, less than or equal to 0.003% of S, 0.015% to 0.030% of Nb, 0.010% to 0.020% of Ti, 0.020% to 0.055% of Alt (Al total), 0.10% to 0.20% of Cr, 0.30% to 0.50% of Ni, less than or equal to 0.38% of CEV, less than or equal to 0.18% of Pcm, and the balance of Fe and impurities; wherein the steel plate is 120mm thick.

2. The manufacturing method of the S355G10 super-thick steel plate for ocean engineering according to claim 1, wherein the S355G10 super-thick steel plate is prepared from the following chemical components according to mass percent: 0.06% of C, 1,54% of Mn, 0.26% of Si, 0.010% of P, 0.002% of S, 0.027% of Nb, 0.013% of Ti, 0.035% of Alt (Al total), 0.13% of Cr, 0.41% of Ni, 0.36% of CEV, 0.15% of Pcm and the balance of Fe and impurities.

3. The manufacturing method of the S355G10 super-thick steel plate for ocean engineering according to claim 1, wherein the S355G10 super-thick steel plate is prepared from the following chemical components according to mass percent: 0.07% of C, 1.48% of Mn, 0.24% of Si, 0.011% of P, 0.002% of S, 0.025% of Nb, 0.015% of Ti, 0.033% of Alt (Al total), 0.15% of Cr, 0.46% of Ni, 0.37% of CEV, 0.16% of Pcm and the balance of Fe and impurities.

4. The manufacturing method of the S355G10 super-thick steel plate for ocean engineering according to claim 1, wherein the manufacturing method of the S355G10 super-thick steel plate for ocean engineering comprises a steelmaking process, a slab heating process, a rolling process, a controlled cooling process and a tempering process,

steelmaking process: Deep dephosphorization in a converter is adopted to make the P content in the molten steel be 0.010% of P, pretreatment and desulfurization of molten iron and LF deep desulfurization are adopted to make the S content in the molten steel be 0.002%, continuous casting adopts dynamic soft reduction and electromagnetic stirring to produce 320mm continuous casting slabs with center segregation of level C0.5;

heating process: The casting slabs are heated in a heating furnace, the heating coefficient is 11.2min/cm, and the heating temperature is 1,203 DEG C;

rolling process: A two-stage controlled rolling process is adopted, the final temperature of the rough rolling in the first stage is 1,002 DEG C, and the initial rolling temperature in the second stage is 803 DEG C, and the finish rolling temperature is 782 DEG C;

cooling process: The rolled steel plate enters an ultra-fast cooling system for rapid cooling, the cooling rate is 17 DEG C/s, the self-tempering temperature is 535 DEG C, and then the stacking slow cooling is conducted;

tempering process: The tempering temperature is 571 DEG C, the holding time in the furnace is 350min, and after the tempering, the slabs are stacked separately and air-cooled to room temperature.

5. The manufacturing method of the S355G10 super-thick steel plate for ocean engineering according to claim 1, wherein the manufacturing method of the S355G10 super-thick steel plate for ocean engineering comprises a steelmaking process, a slab heating process, a rolling process, a controlled cooling process and a tempering process,

steelmaking process: Deep dephosphorization in a converter is adopted to make the P content in the molten steel be 0.011%, pretreatment and desulfurization of molten iron and LF deep desulfurization are adopted to make the S content in the molten steel be 0.002%, continuous casting adopts dynamic soft reduction and electromagnetic stirring to produce 320mm continuous casting slabs with center segregation of level C1.0;

heating process: The casting slabs are heated in a heating furnace, the heating coefficient is 10.6min/cm, and the heating temperature is 1,209 DEG C;

rolling process: A two-stage controlled rolling process is adopted, the final temperature of the rough rolling in the first stage is 992 DEG C, and the initial rolling temperature in the second stage is 807 DEG C, and the finish rolling temperature is 791 DEG C;

cooling process: The rolled steel plate enters an ultra-fast cooling system for rapid cooling, the cooling rate is 14 DEG C/s, the self-tempering temperature is 564 DEG C, and then the stacking slow cooling is conducted;

tempering process: The tempering temperature is 586 DEG C, the holding time in the furnace is 386min, and after the tempering, the slabs are stacked separately and air-cooled to room temperature.